BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

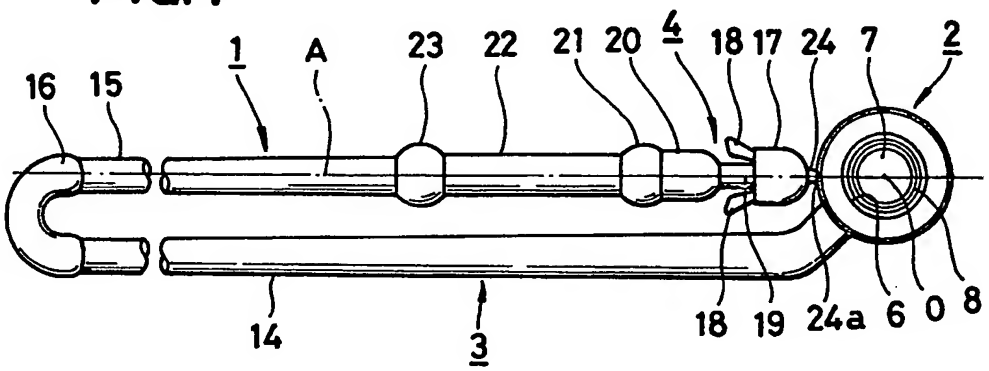
(12)UK Patent Application (19)GB (11) 2 103 274 A

(21) Application No 8217058
(22) Date of filing
11 Jun 1982
(30) Priority data
(31) 56/093639
56/093640
56/098386
56/129411
(32) 26 Jun 1981
26 Jun 1981
26 Jun 1981
20 Aug 1981
(33) Japan (JP)
(43) Application published
16 Feb 1983
(51) INT CL³ F16B 2/08
(52) Domestic classification
E2A 372 CAM GM
U1S 1789 2287 2291
E2A
(58) Documents cited
GB A 2037874
GB 1545642
GB 1198558
GB 1190126
GB 1183653
GB 1133159
GB 1048803
GB 0943433
(58) Field of search
E2A
(71) Applicants
KK Nihon Bano'K
(Japan)
17–4 Nihonbashi
Kayabacho 2-chome
Chuo-ku
Tokyo
Japan
KK Toska
(Japan)
2–10 Iwamotocho
3-chome
Chiyoda-ku
Tokyo
Japan
(72) and (74) continued overleaf

(54) **Fastener**

(57) A fastener 1, comprising an integral body molded from a thermoplastic synthetic resin, has a socket 2 with an insertion hole 7, an insertion head 4 to be inserted into the socket and a filament 3 having the socket and the insertion head at one and the other ends thereof. The filament is folded at a middle point of its length, and, prior to use, the socket and the insertion head are connected to each other at or in the proximity of their respective outer ends by a frangible tie 24. The folded parallel filament portions may also be connected to each other by frangible ties (26, Fig. 11 not shown). Several fasteners may be formed together, and, prior to use, may remained connected to each other, directly or indirectly, by further frangible ties (29, 30, Fig. 19 not shown).

FIG.4



GB 2 103 274 A

(72) Inventor
Masami Kato
(74) Agents
J Miller and Co
Lincoln House
296–302 High Holborn
London WC1V 7JH

FIG.1

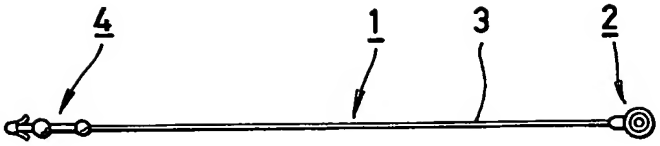


FIG.2

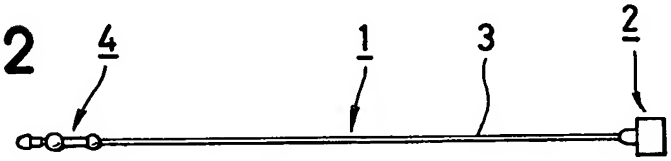


FIG.3

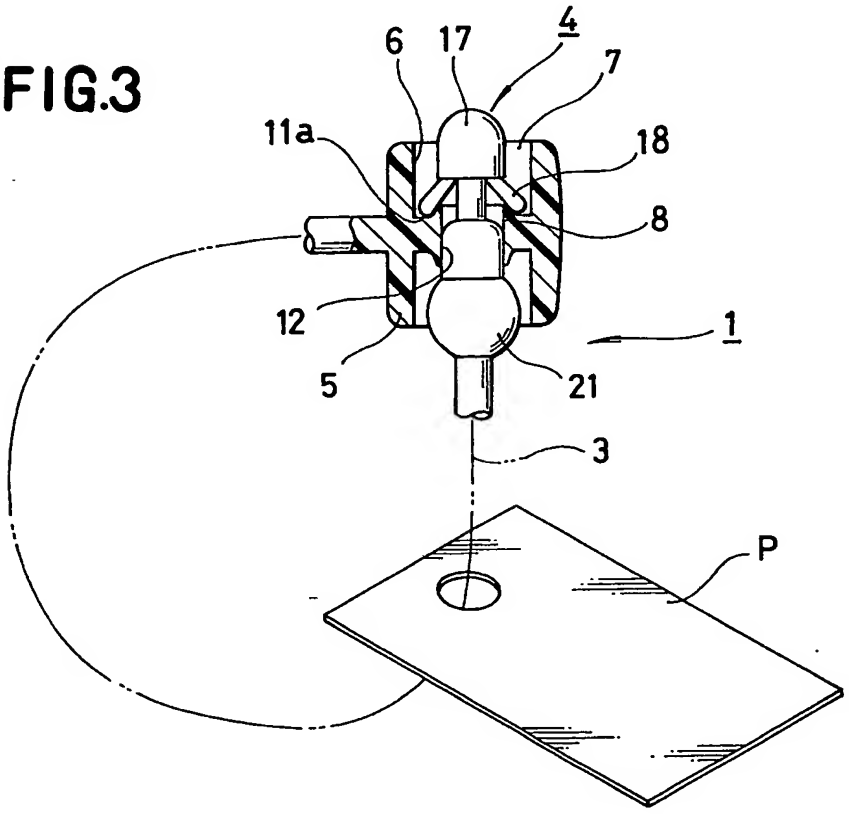


FIG.4

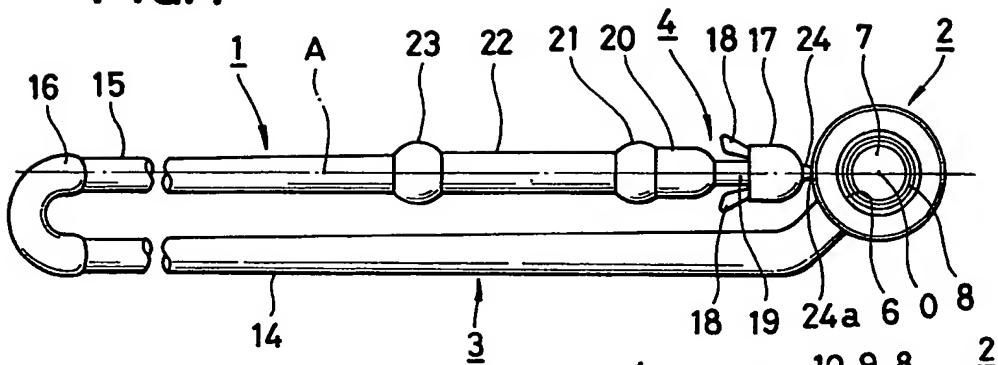


FIG.5

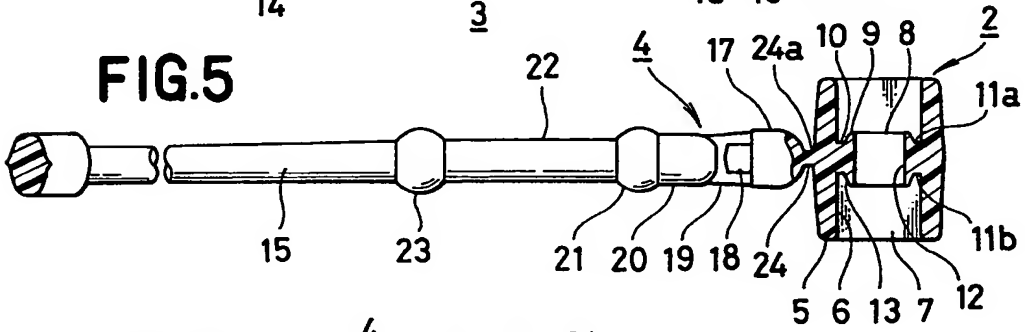


FIG.6

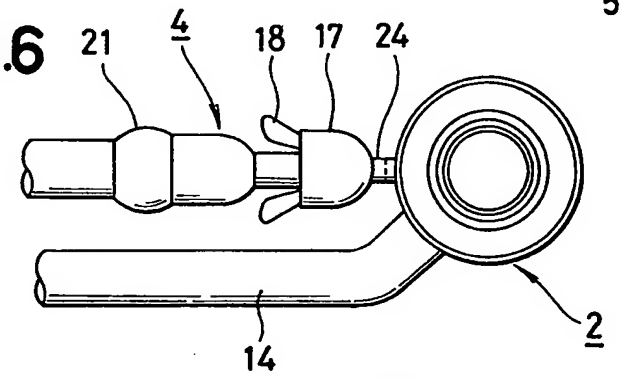


FIG.7

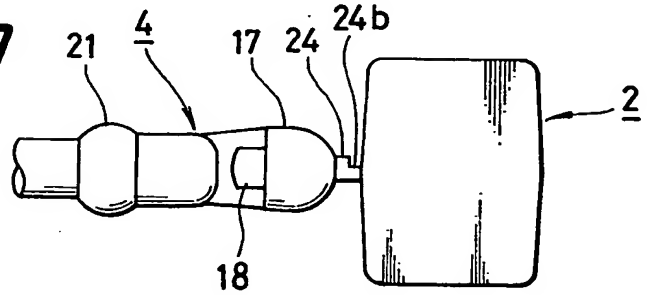


FIG.8 A

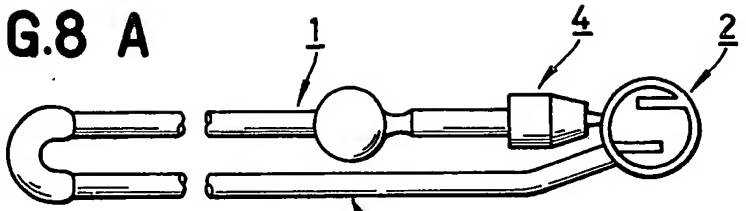


FIG.8 B

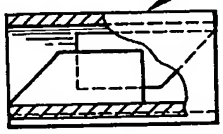


FIG.8 C

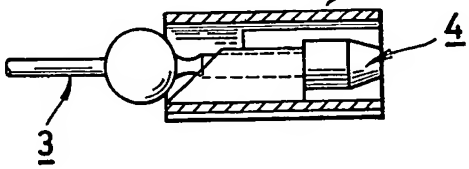


FIG.9 A

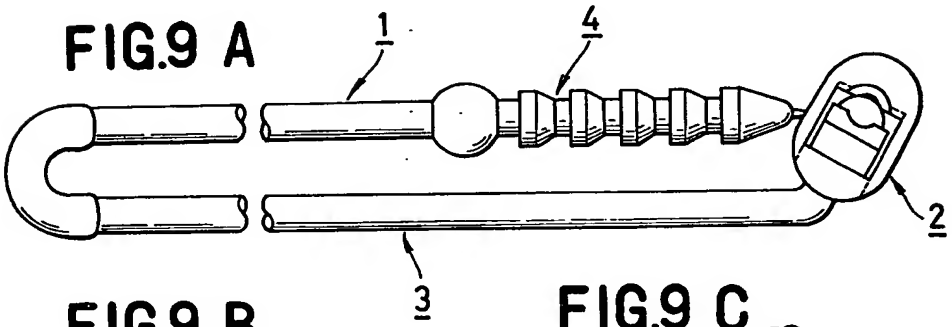


FIG.9 B

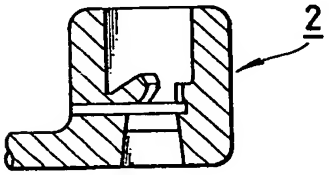


FIG.9 C

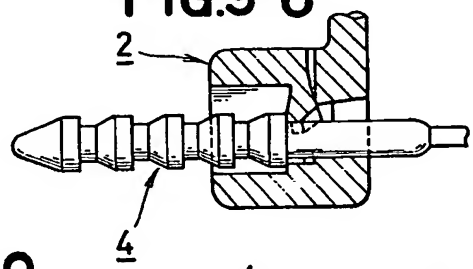


FIG.10

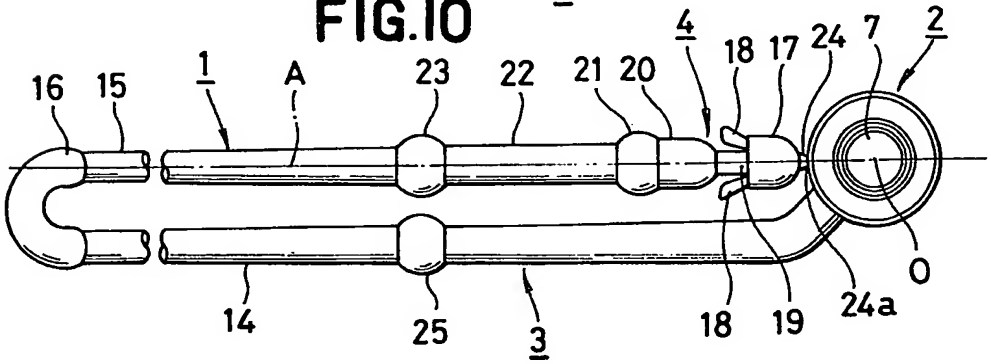


FIG.11

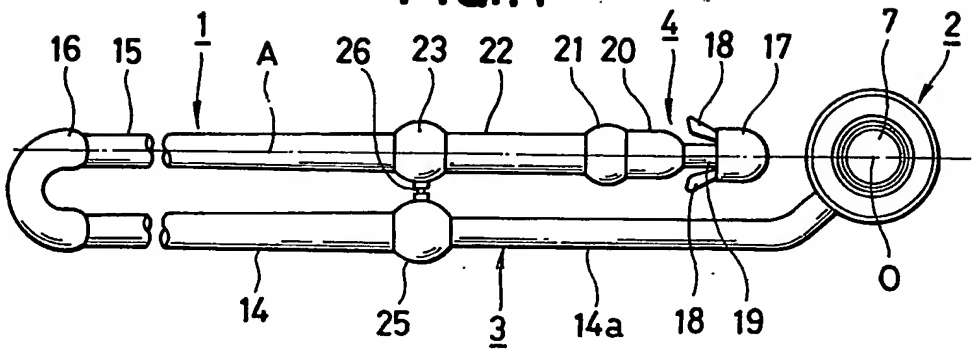


FIG.12

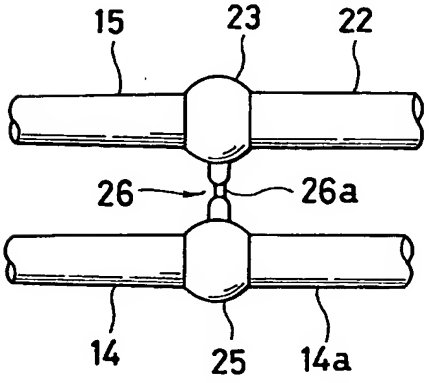


FIG.13

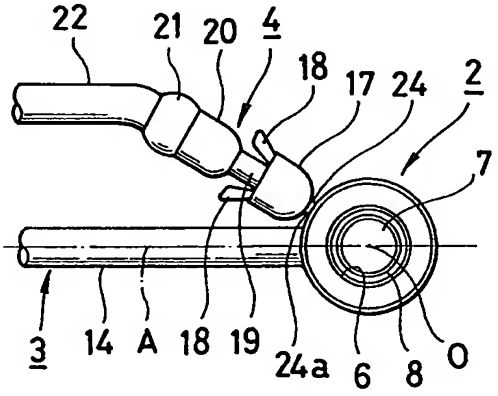


FIG.14

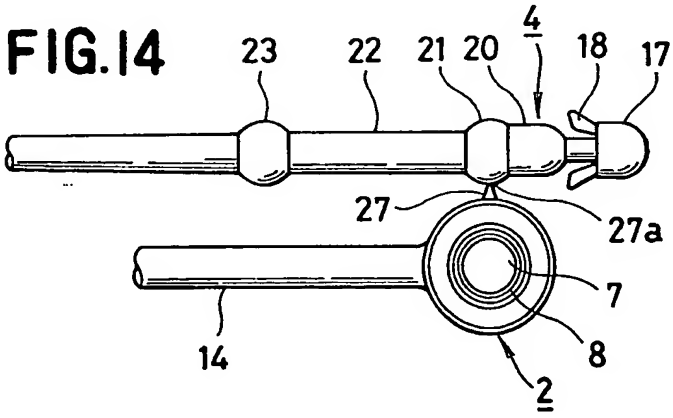


FIG.15

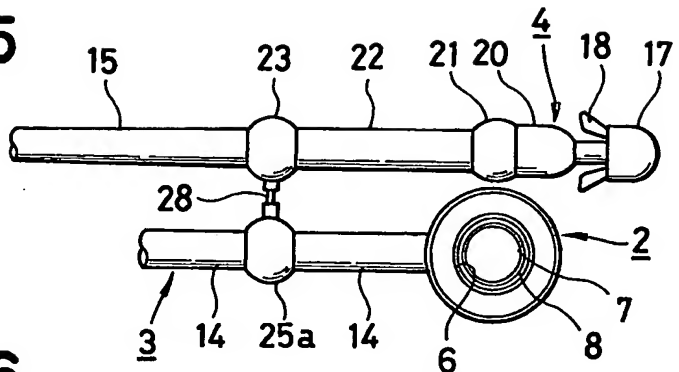


FIG.16

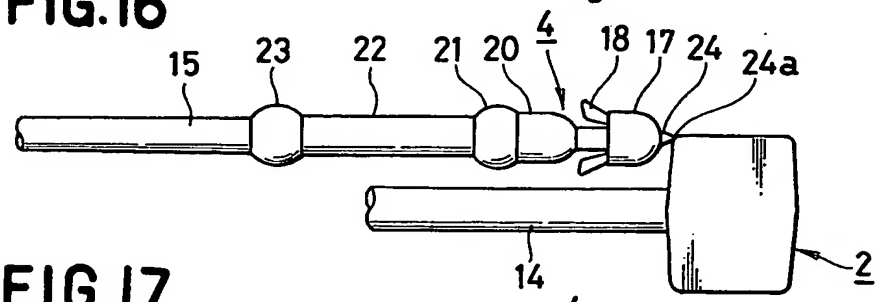
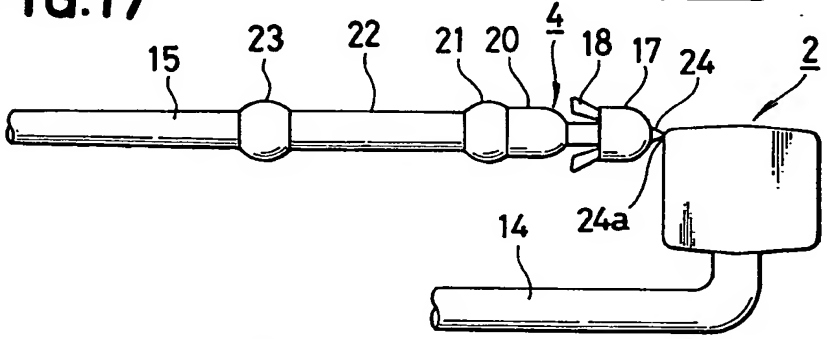


FIG.17



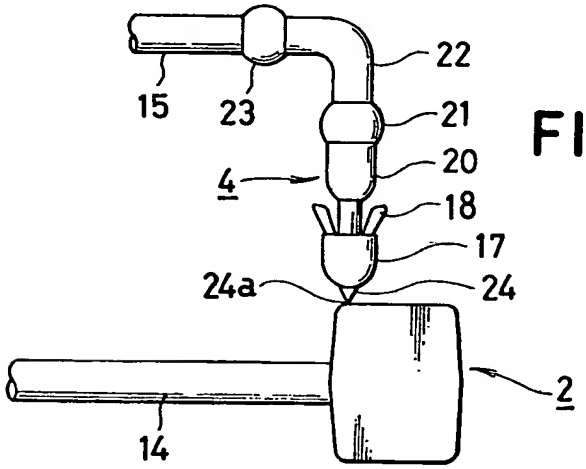


FIG.18

FIG.19

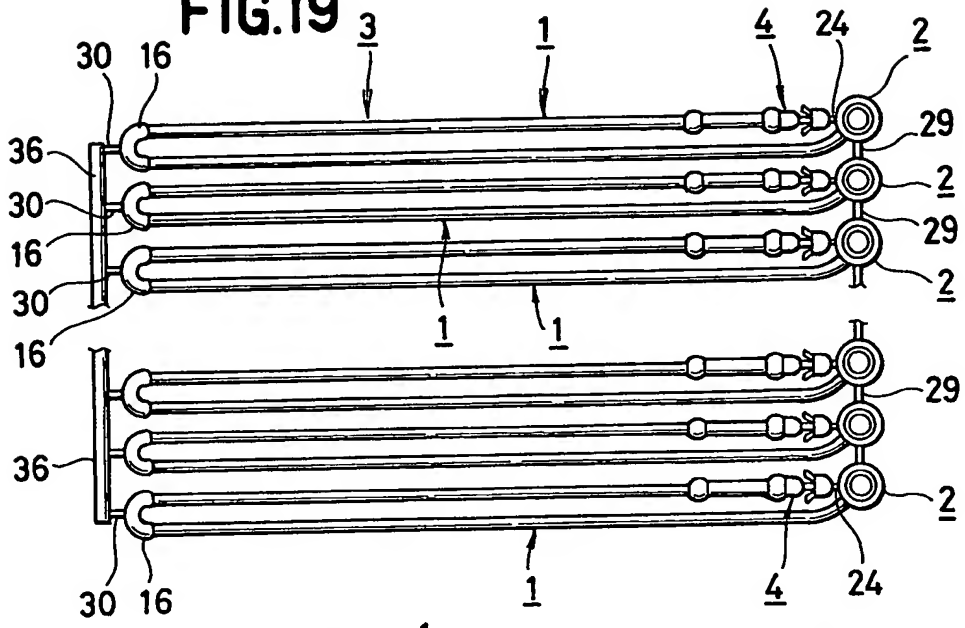


FIG.20

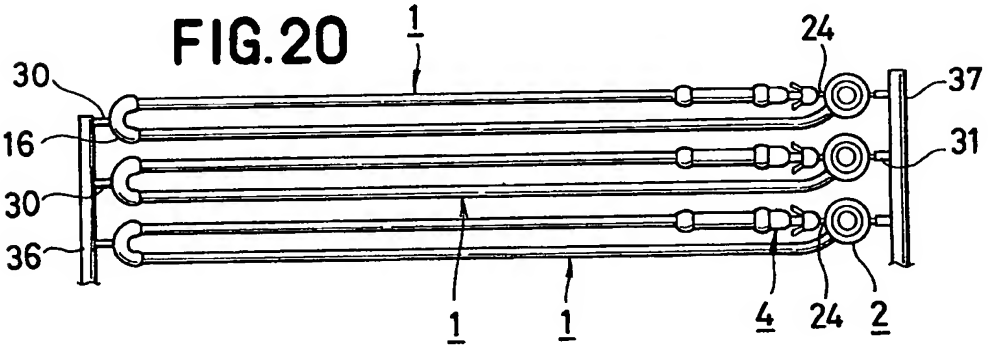


FIG.21

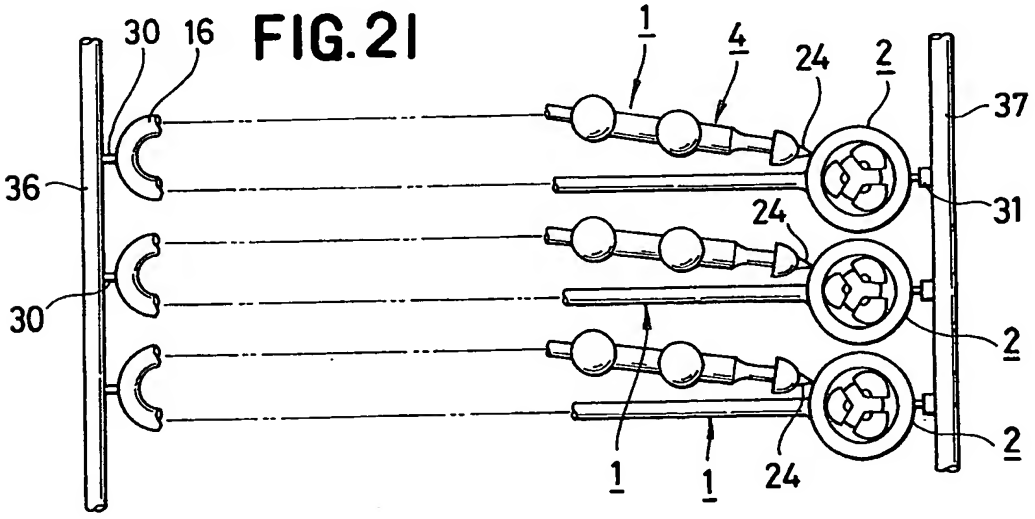
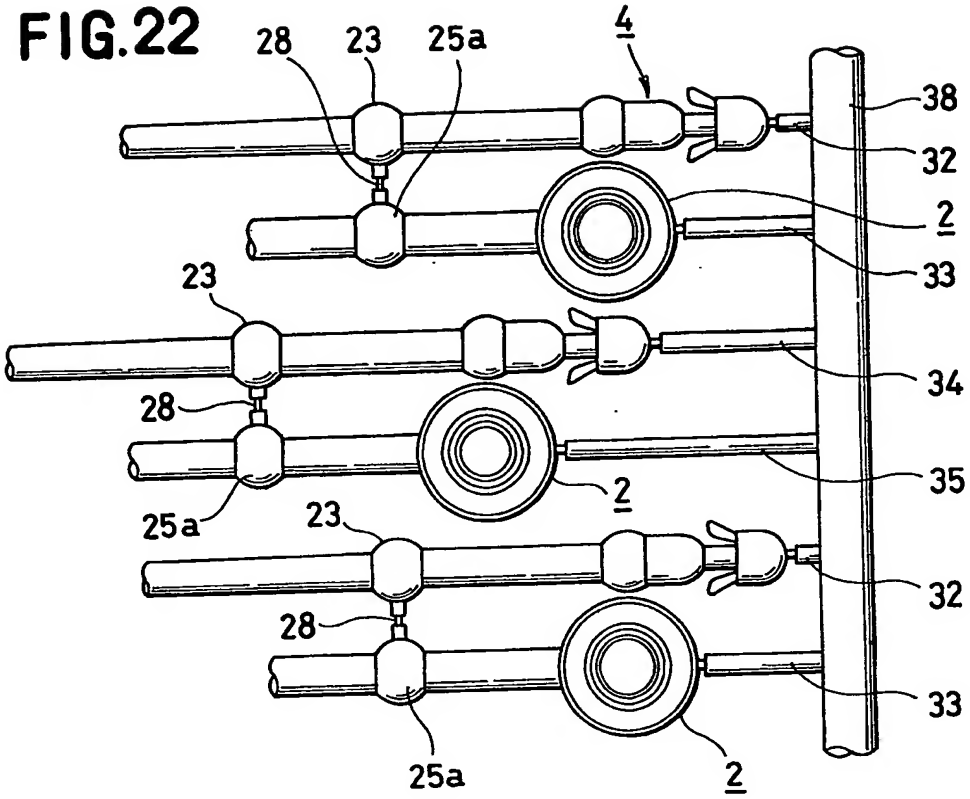


FIG.22



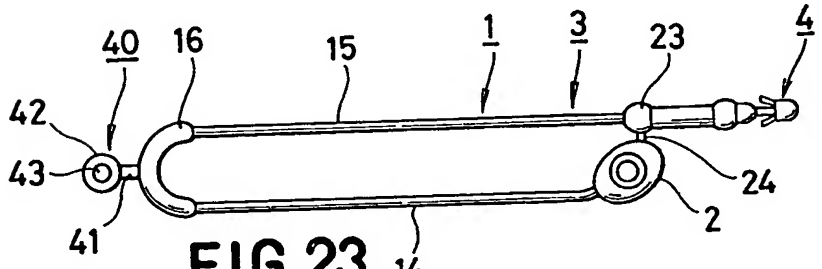


FIG.23

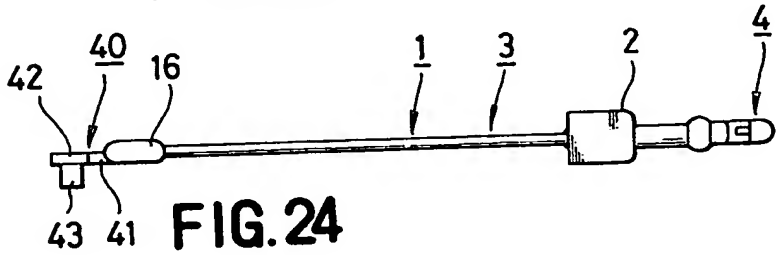


FIG.24

FIG.25

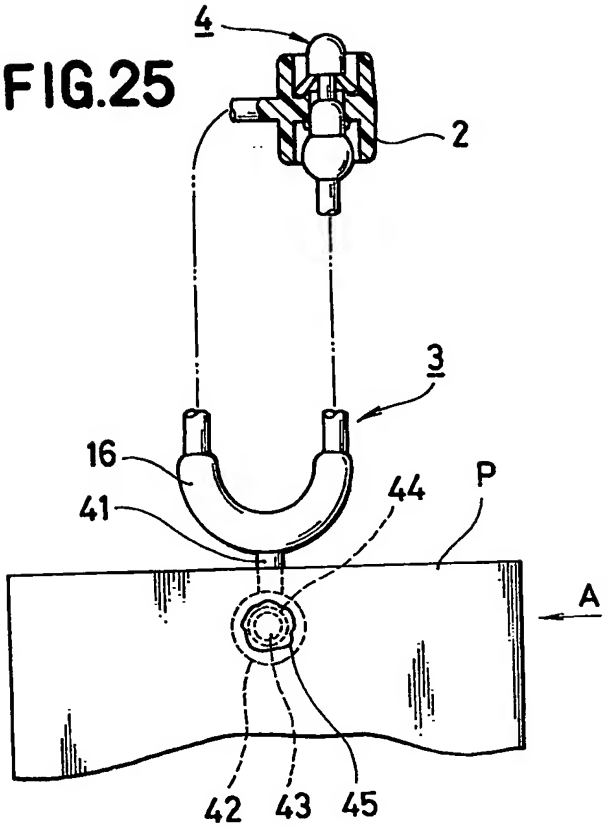


FIG.26

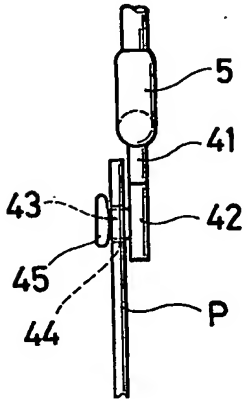


FIG.27

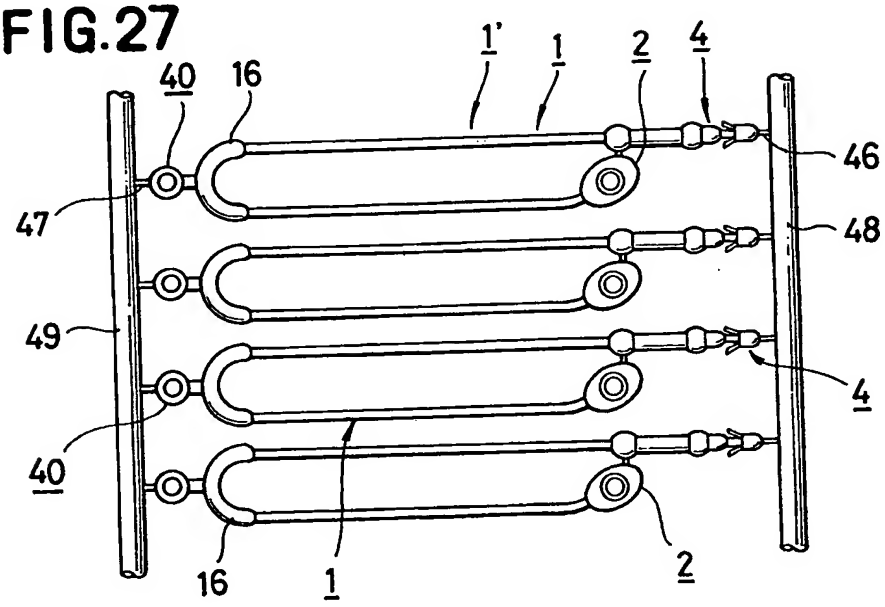


FIG.28

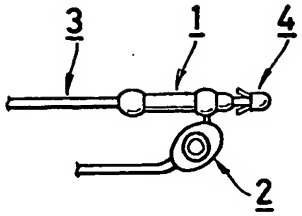


FIG.29 A

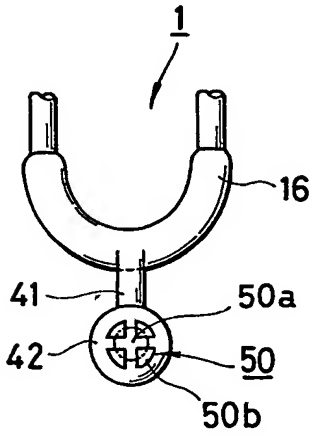


FIG.29 B

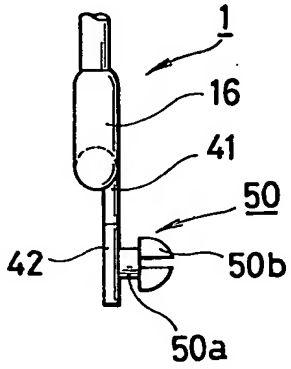


FIG.30 A

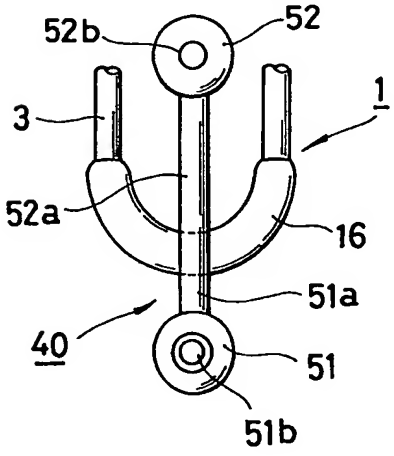


FIG.30 B

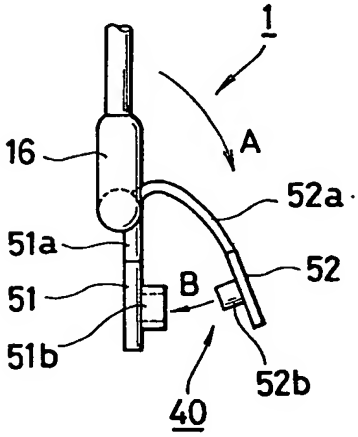


FIG.31 A

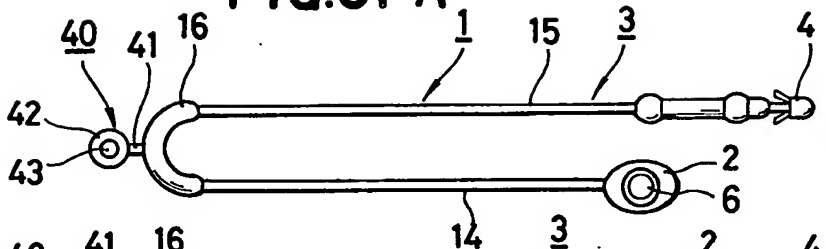


FIG.31 B

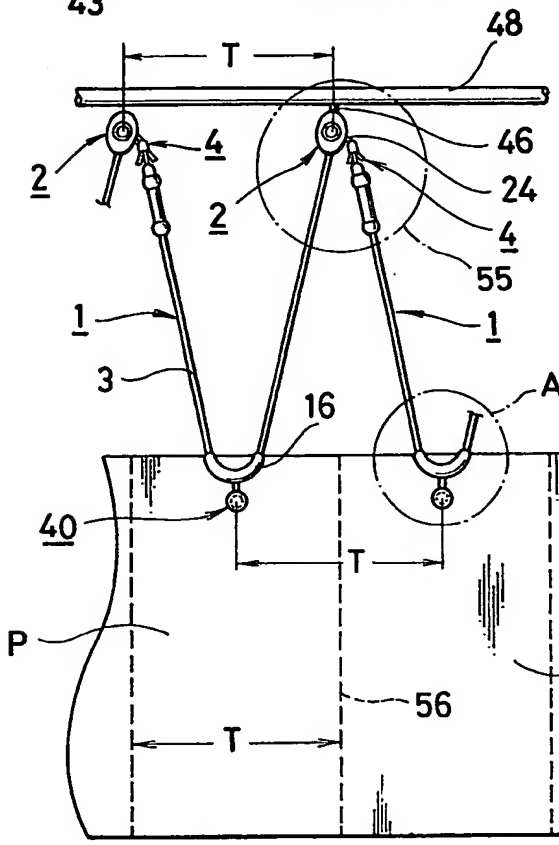


FIG.32 A

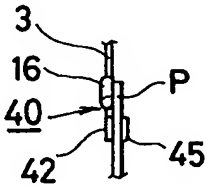


FIG.32 B

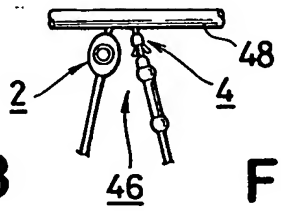


FIG.33

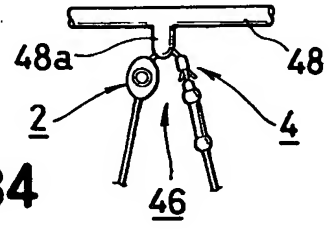


FIG.34

FIG.35

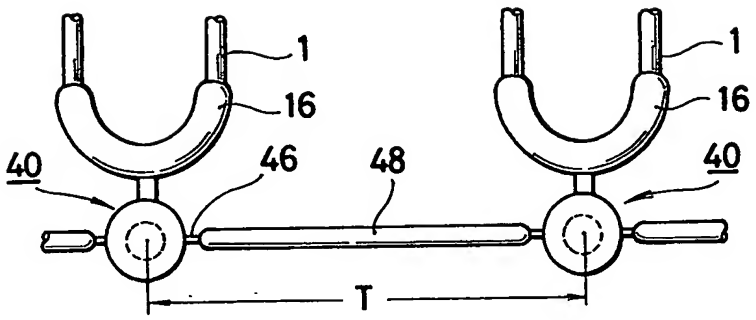


FIG.36

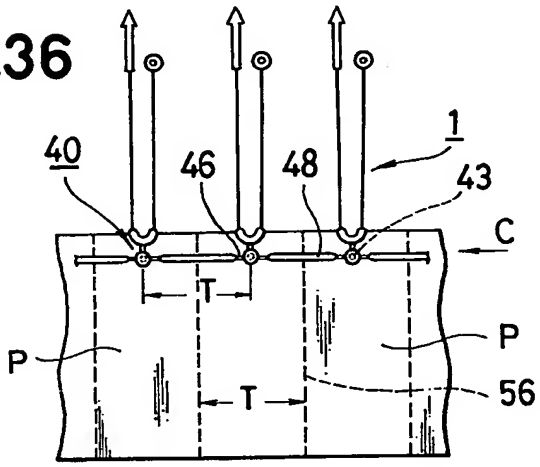


FIG.37

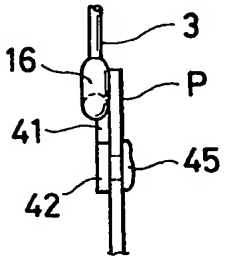


FIG.38 A

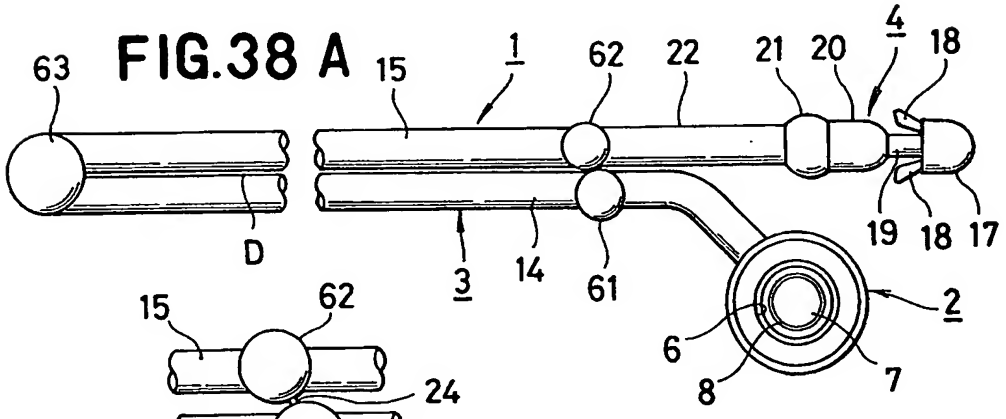


FIG.38 B

FIG.39 A

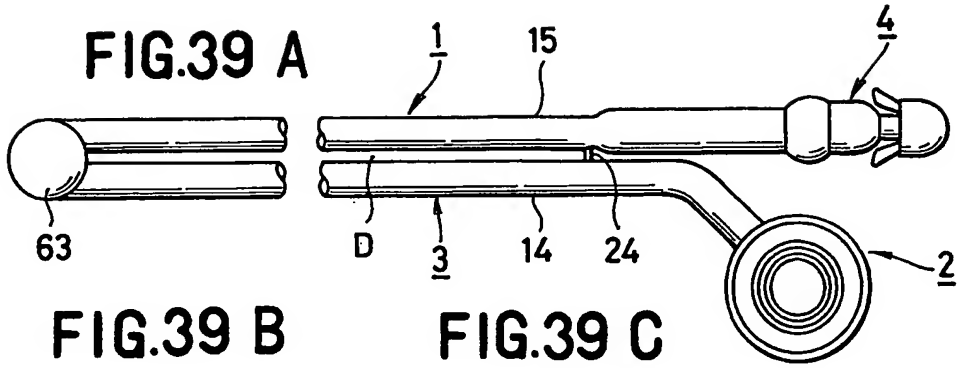


FIG.39 B

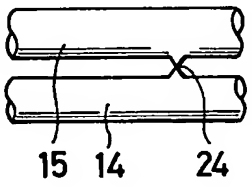


FIG.39 C

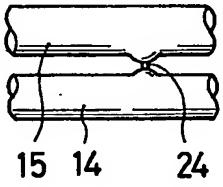


FIG.40 A

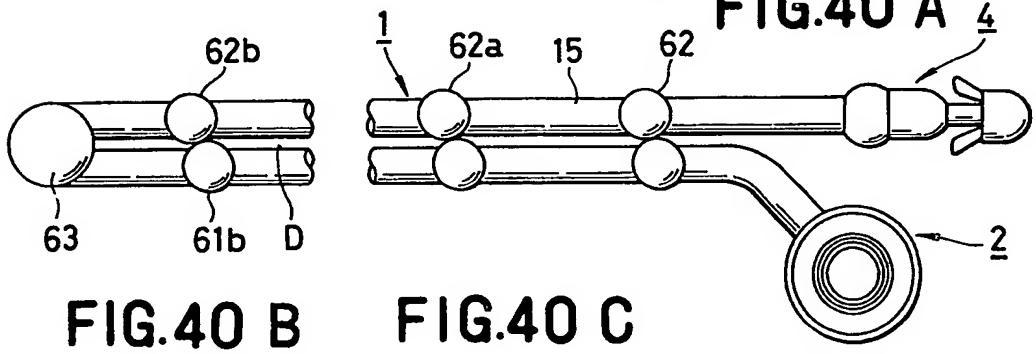


FIG.40 B

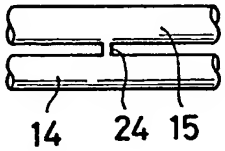


FIG.40 C

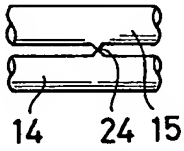


FIG.40 D

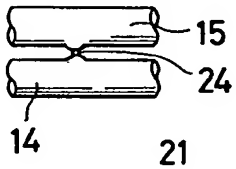


FIG.41

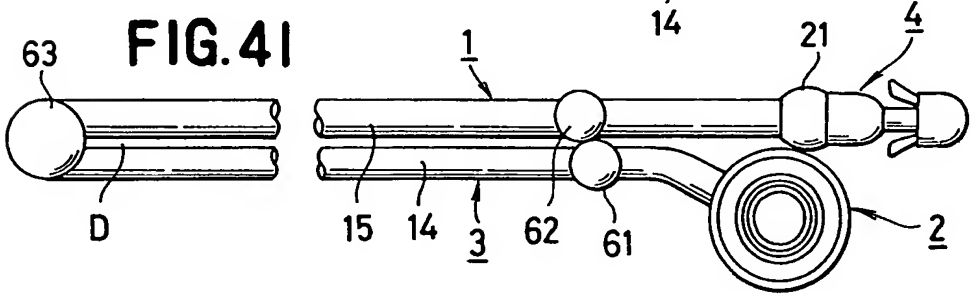
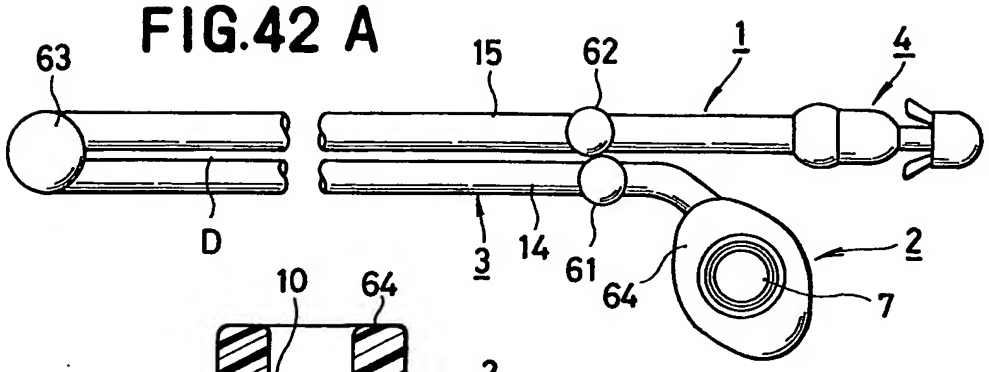


FIG.42 A



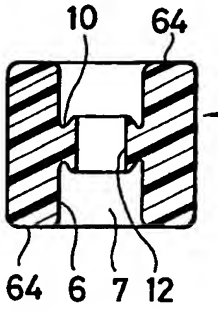


FIG.42 B

FIG.43

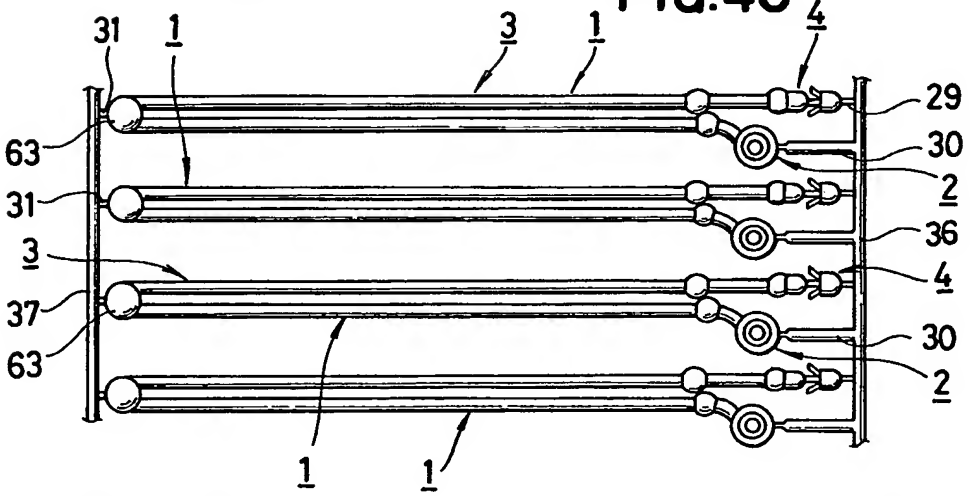
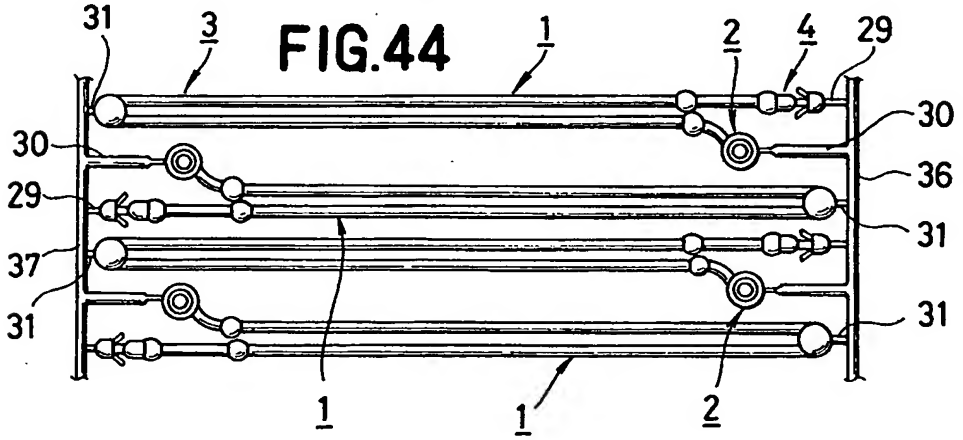


FIG.44



SPECIFICATION

Fastener

The present invention relates to a fastener consisting of a socket having an insertion hole, an insertion head to be inserted through the insertion hole and a filament having the socket at one end and the insertion head at the other, all these structural members integrally formed of synthetic resin.

This kind of fastener has found wide use such as in attaching tags and labels to merchandise, tying together paired articles such as slippers and sandals, or sealing the opening of bags or the cover of instruments.

Figs. 1 and 2 show the plan and side views of this kind of conventional fasteners. The fastener 1 has at one end of a filament 3 a socket 2 with an insertion hole and at the other end an insertion head 4. All these component members are integrally formed of synthetic resin in a straight line. Generally the filament 3, after being formed, is drawn to have a greater length and smaller diameter.

When using the conventional fasteners of the above construction, the following steps are taken. As shown in Fig. 3, the fastener 1 is passed through a hole of a tag *P* to support the tag *P* on the filament 3; the socket 2 and the insertion head 4 are held by fingers of each hand; and the insertion head 4 is inserted into the insertion hole of the socket 2 to form a closed loop with engagement pieces 18 at the insertion head 4 blocking the insertion head from being withdrawn from the socket.

Manual work of coupling the socket and insertion head of the conventional fasteners takes much time when attaching price tags and labels to a large quantity of articles.

For the fasteners with long filaments 3, it is not easy to find and pick up the socket and the insertion head and therefore the coupling work is not efficient.

To improve the efficiency of coupling work efforts have been made to couple the socket and the insertion head by the use of instruments. However, it was difficult to develop such a coupling device for the following reasons. The socket and the insertion head are separated far apart through the long filament, and the socket and the insertion head, when put close together, tend to easily snap back to their separated positions due to the elasticity of the filament.

Since the fasteners are also used in tying together two or more articles in addition to attaching tags, the filament is required to have a length which is greater than a certain value and have a diameter which is smaller than a certain diameter so as to provide flexibility.

However, there are certain limits to the length and diameter of the filament because the melted resin has a high viscosity when poured into a mold and therefor will not easily flow into the mold which is narrow and long.

Thus, the conventional practice was to form the filament by the mold which has a greater diameter than a certain value and a shorter length than a certain value and to stretch it to provide a long and slender filament. There is however a limit to the extent to which the filament can be elongated.

Therefore, when it is desired to form fasteners with a long filament, the length of the mold must inevitably be long requiring increased melted resin injection pressure.

Accomplished to overcome the aforementioned drawbacks of the conventional fasteners, the present invention has an object to provide a fastener which facilitates the coupling by a coupling instrument of the socket and the insertion head.

A second object of this invention is provide a fastener which has a sufficiently long filament which is obtained by molding without subjecting it to the drawing process after molding. More specifically stated, the second object is to provide a fastener which has a filament at least two times longer than the filament of the conventional fastener if it is not subjected to the stretching process.

A third object of this invention is to provide a fastener which enables the length of mold to be halved and the injection pressure to be reduced when forming the fastener almost equal in length to the conventional fastener, thereby reducing the size and energy consumption of the fastener molding device.

A fourth object of this invention is to provide a fastener which enables the travel or stroke of the extension machine to be halved when elongating the filament.

A fifth object of this invention is to provide a set of fasteners which when packed in cartons and transported will not be disturbed in arrangement and not entangle each other so that the work for attaching the price tags and labels to merchandise can be performed efficiently.

A sixth object of this invention is to provide a fastener in which a tag is fixed to a part of filament so that it will not slide along the filament and in which the tag can be securely attached to the fastener prior to applying the fastener to an article.

A seventh object of this invention is to provide a fastener which does not require manual work in attaching a tag to the fastener and also enables a large number of tags to be attached to the fasteners at a time.

The above first through fourth objects can be achieved by a fastener which comprises a socket having an insertion hole; an insertion head to be inserted into the socket; and a filament having the socket at one end and the insertion head at the other, these three struc-

tural members being integrally formed of the moplastic synth ric resin; whereby th filament is folded at the middl portion and a weak connection is formed between the external end of socket and the external end of insertion head, or between the insertion head and the filament portion near the socket in such a manner that they can easily be separated from each other.

The above first through fifth objects can be achieved by a fastener in which a filament portion extending from the socket and a filament portion extendng from the insertion head are held together and connected to each other directly or through expanded portions provided to these filament portions in such a manner that they can easily be separated at the connected portion.

The sixth object of this invention can be achieved by a fastener which has a tag mount at the middle of the filament where the filament is folded.

The seventh object of this invention can be achieved by a fastener which has tag mount at the middle portion of the filament where the filament is folded and in which the sockets and the insertion heads or the tag mounts are attached through weak connections to a tie rod and the intervals between the adjacent tag mounts are set equal to the intervals between the holes of tags.

Figure 1 is a plan view of a conventional fastener;

Figure 2 is a side view of the conventional fastener as illustrated in Fig. 1;

Figure 3 is an explanatory view showing how the fastener is used;

Figure 4 is a plan view showing a first embodiment of the present invention;

Figure 5 is a side view of the fastener as shown in Fig. 4;

Figures 6 and 7 are partially enlarged views of the fastener shown in Figs. 4 and 5;

Figures 8A, B, C and 9A, B, C are plan views illustrating other structures of the socket and insertion head;

Figure 10 is a plan view showing a second embodiment of this invention;

Figure 11 is a plan view showing a third embodiment of this invention;

Figure 12 is a partially enlarged view of the fastener as illustrated in Fig. 11;

Figure 13 is a plan view showing the main portion of a fourth embodiment of this invention;

Figure 14 is a plan view showing the main portion of a fifth embodiment of this invention;

Figure 15 is a plan view showing the main portion of a sixth embodiment of this invention;

Figure 16 is a plan view showing the main portion of a seventh mbodiment of this inv ntion;

Figure 17 is a plan view showing the main portion of an eighth embodiment of this invention;

Figure 18 is a plan view showing a ninth embodiment of this invention;

Figure 19 is a plan view showing a tenth embodiment of this invention;

Figure 20 is a plan view showing an eleventh embodiment of this invention;

Figure 21 is a partially enlarged plan view showing a twelfth embodiment of this invention;

Figure 22 is a partially enlarged plan view showing a thirteenth embodiment of this invention;

Figure 23 is a plan view showing a fourteenth embodiment of this invention;

Figure 24 is a side view of the embodiment as shown in Fig. 23;

Figures 25 and 26 are explanatory views showing how the fastener illustrated in Figs. 23 and 24 is used;

Figure 27 is a fifteenth embodiment of this invention;

Figure 28 is a plan view showing the main portion of a sixteenth embodiment of this invention;

Figure 29A is an elarged plan view showing the main portion of a seventeenth embodiment of this invention;

Figure 29B is a side view of the embodiment as illustrated in Fig. 29A;

Figure 30A is an enlarged plan view showing the main portion of an eighteenth embodiment of this invention;

Figure 30B is a partially enlarged side view showing how the fastener of Fig. 30A is used;

Figures 31A and 31B are plan and side views of an indivisual fastener according to a ninteenth embodiment of this invention;

Figures 32A and 32B are partial plan and side views of the embodiment as illustrated in Figs. 31A and 31B.

Figure 33 is a plan view showing the main portion of a twentieth embodiment of this invention;

Figure 34 is a plan view showing the main portion of a twenty-first embodiment of this invention;

Figure 35 is a partial plan view of a twenty-fourth embodiment of this invention showing the connection of each fastener;

Figure 36 is a partial plan view of the 24th embodiment as illustrated in Fig. 35;

Figure 37 is a partial side view of the 24th embodiment as illustrated in Fig. 35;

Figure 38A is a plan view showing the main portion of a twenty-fifth mbodiment of this inv ntion;

Figure 38b is an enlarged plan view of the embodiment as illustrated in Fig. 38;

Figure 39A is a plan view showing a twenty-sixth embodiment of this invention;

Figures 39B and 39C are partially enlarged views of th embodiment as illustrat d in Fig. 39A;

Figure 40A is a plan vi w showing a twenty-seventh embodiment of this invention;

Figures 40B, 40C and 40D are enlarged views of the embodiment as illustrated in Fig. 40A;

Figure 41 is a plan view showing a twenty-eighth embodiment of this invention;

Figure 42A is a plan view showing a twenty-ninth embodiment of this invention;

Figure 42B is a cross sectional view of the main portion of the embodiment as illustrated in Fig. 42A;

Figure 43 is a plan view showing a thirtieth embodiment of this invention; and

Figure 44 is a plan view showing a thirty-first embodiment of this invention.

The present invention will be explained in the following in conjunction with the preferred embodiments of this invention referring to the accompanying drawings.

Figs. 4 and 5 are plan view and partial cross-sectional views of a first embodiment of a fastener according the present invention.

The fastener 1 consists of a socket 2, a filament 3 extending from one side of the socket 2, and an insertion head 4 provided at the front end of the filament 3.

These constitutional members are integrally formed in one pieces of thermoplastic synthetic resin such as nylon, polypropylene, polyethylene or polyester.

The socket 2 is formed cylindrical for example and this cylindrical body 5 has an insertion hole 7 surrounded by an annular wall 6 into which the insertion head 4 is passed. To hold the insertion head 4 against being drawn out of engagement with the socket, the socket 2 has a circular engagement tooth 8 in the insertion hole 7 at the center. The engagement tooth 8 in this case is provided around the entire inner circumference of the annular wall 6 but may be provided only to a part of the inner circumference.

To describe in more detail, the engagement tooth 8 consists of an annular projection 9 concentric with the socket 2 and a connecting portion 10 connecting the annular projection 9 and the annular wall 6. The connecting portion 10 is formed with engagement surfaces 11a and 11b on each side so that the insertion head 4 can be inserted into the socket 2 in either direction for engagement with one of the surfaces 11a, 11b.

Designated at 12 is a guide surface of the annular projection 9, and 13 a slide surface which is slanted about 10 or more degrees with respect to the axis f the socket 2. The slide surface 13 may be set at angles less than 10 d grees or it may be set parallel t the axis of th socket 2.

The filament 3 forms a loop when the insertion head 2 at one end of the filament 3 is inserted into the insertion hole 7 of the socket 2 at th other to ti tog ther paired articles or attach a tag hanging on th loop to an article.

In this invention, the filament 3 is folded at the middle and the filament portion 14 x-tending from the socket 2 and the filament portion 15 extending from the insertion head 4 are set almost parallel, with their ends tied together by the intermediate expanded portion 16.

In the first embodiment, the center line A of the filament portion 15 passes the axis *O* of the socket 2 and the external end of the insertion head 4 is connected to the external end of the socket 2 so that the filament 3 as a whole looks like a letter J. The connection between the insertion head 4 and the socket 2 is such that it can easily be broken to separate them. The filament portions 14 and 15 may be subjected to an extension process after the molding to improve the strength and flexibility. This extension process may be done with the filament still inside the mold immediately after it is formed, or a dedicated device for extension may be used.

The insertion head 4, which is to be inserted into the insertion hole 7, has at the front end a head portion 17 slightly smaller in diameter than the annular projection 9 of the socket 2. The head portion 17 is shaped like a bullet to facilitate the insertion into the hole 7. The front end of the head portion 17 is connected to the side of the socket 2 through a first tie piece 24.

The first tie piece 24 is a member to hold the insertion head 4 attached to the socket 2 so that the fastener 1 forms an endless loop until the tie piece is broken to insert the insertion head 4 in the hole 7 of the socket 2. Just before the insertion head 4 is fitted into the insertion hole 7, the insertion head 4 can easily be separated from the socket as by twisting the insertion head 4 with the socket held immovable.

As can be seen from Figs. 4 and 5, the first tie piece 24 is formed almost conical and the junction 24a with the socket 2 is made smaller in diameter than any other portion of the fastener 1.

The fact that the fastener 1 forms an endless loop through the first tie piece 24 until the insertion head 4 is separated makes the packing work as well as the tagging work very easy.

The first tie piece 24 may be formed into any shape as long as it can keep the insertion head 4 attached to the socket 2 until the fastener is used. For example the tie piece may be formed into column, as shown in Figs. 6 and 7, with only the junction 24b with th socket 2 throttled for easy separation.

A second, third and fourth tie pieces 26, 27, 28 to be described later have the same function as the first tie pi ce 24.

A pair of engagement pieces 18 are radially proj cted fr m the rear end surface of the head p rtion 17. Th engagement pieces 18,

when th insertion head 4 is inserted into the socket 2, comes into contact with the engagement surface 11a or 11b of th engagement tooth 8 to prevent the head 4 from being retracted out of engagment with the socket 2. In Fig. 4 as viewed from the side, the junction with the rear end of the head portion 17 is made thin and the thickness of the engagement pieces gradually increases toward the rear free end thus forming a wedge shape.

When not engaged with the socket (Fig. 4), the engagement pieces 18 which have some resiliency expand toward the rear end of the insertion head 4 at an angle.

The number of engagement pieces 18 is not limited to two but the use of two engagement pieces facilitates the removal of formed fasteners from the mold. The engagement pieces 18 may be provided to other portion than the rear end of the head portion 17.

Formed behind the rear end of the head portion 16 are a first connector rod 19, a body portion 20 and a virtually global stopper 21 in that order. The first connector rod 19 is somewhat flat because it is disposed between the two engagement pieces 18. The body portion 20 is formed columnar and smaller in diameter than the annular projection 9. The stopper 21 restricts the amount of travel or distance that the insertion head 4 is allowed to move beyond the engagement tooth 8 and at the same time minimizes the play the insertion head has when inserted into the hole 7. It is desirable that the stopper 21 be formed such that its diameter is somewhat greater than that of the head portion 17. It is however not necessary to provide the stopper 21 and it may be given any desired shape when the distance the insertion head 4 is allowed to travel beyond the engagement tooth 8 is not restricted.

At the left of the stopper 21 toward the filament portion 15 is formed a second connector rod 22, and at the boundary between the connector rod 22 and the filament portion 15 is formed a grip portion 23. The provision of the grip portion 23 enables the fastener 1 to be held easily by hand when inserting the insertion head 4. The grip portion 23 does not have to be provided and may be given any shape or formed to have a smaller diameter than the stopper 21.

The following embodiments will be explained centering on the socket 2 and the insertion head 4 as shown in Figs. 4 and 5. The present invention, however, is not limited to the particular constructions of the socket and insertion head as described in th succeeding descriptions but covers any construction as long as the insertion head is inserted into the socket for secure engagement. For example, the socket 2 and the ins rtion head 4 can be constructed as shown in Figs. 8A to 8C and 9A to 9C.

Fig. 10 illustrates a sec nd embodim nt of this invention in which a bulge 25 is provided to the filament portion 14 at a location corresponding to the grip portion 23 on the filament portion 15 to ensure that the filament will be extended over the entire length in the drawing process after it has been molded.

In the drawing process the intermediate expanded portion 16 is held by one gripper of the drawing machine and the grip portion 23 and bulge 25 are clamped by another gripper, and the the two grippers are drawn apart elongating the filament portions 14 and 15 uniformly without breaking the first tie piece 24.

Fig. 11 shows a third embodiment in which the grip portion 23 and the bulge 25 are connected by a second tie piece 26 which replaces the first tie piece 24 connecting the socket 2 and the insertion head 4.

Since in this embodiment the grip portion 23 and the bulge 25 are connected by the second tie piece 26, they can easily be gripped by the drawing machine. This means that drawing operation for the filament portions 14 and 15 becomes easy as compared with the second embodiment (see Fig. 10).

In the third embodiment the filament portion 14a between the socket 2 and the bulge 25 is so formed that its diameter will be almost equal to that of the filament portion 14 that underwent the drawing operation. In the drawing operation where the grip portion 23 and the bulge 25 are gripped by the drawing machine for stretching the filament, it seldom happens that either of filament portions 14 and 15 breaks since they are connected by the tie piece 26.

Fig. 12 is an enlarged view of the second tie piece 26 which is shown to have its center portion 26a throttled.

Fig. 13 shows a fourth embodiment of this invention. The filament portion 14 is arranged so that it lies on the line A passing through the axis *O* of the socket 2. The insertion head 4 is bent so that the head portion 17 is connected to the outer surface of the socket 2 through the first tie piece 24.

Fig. 14 illustrates a fifth embodiment of this invention. The insertion head 4 is projected beyond the socket 2 toward the right as seen in the figure so that the stopper 21 is disposed opposite to the socket 2. The stopper 21 is connected to the outer surface of the socket 2 by a third tie piece 27.

The third tie piece 27, like the first tie piece 24, is formed conical with the junction 27a with the stopper 21 throttled so that no fragments of the tie piece 27 will be l ft on the stopper 21 when the stopper 21 is separated from the socket 2. This assures the smooth insertion of the insertion head 4 into the hole 7 of the socket 2.

Fig. 15 illustrates a sixth embodim nt of this invention, in whch a virtually global bulge 25a is formed n the filament porti n 14 at a

location corr sponding to the grip portion 23 of th insertion head 4 and th grip portion 23 and the bulge 25a are tied t gether by a fourth tie piece 28 which can easily be broken by twisting the insertion head by hand. The fourth tie piece 28 is formed in a manner similar to the second tie piece 26.

Fig 16 shows a seventh embodiment of this invention, in which the head portion 17 of the insertion head is connected to the end portion of the socket 2 through the first tie piece 24. Constructed in this way the interval between the filament portions 14 and 15 can be reduced thereby increasing the number of fasteners that can be formed by a single mold of the same size.

Fig. 17 shows an eighth embodiment of this invention, in which the head portion 17 of the insertion head is connected to the end portion of the socket 2 through the first tie 24. This construction keeps the filament portions 14 and 15 almost parallel to each other when the insertion head 4 is inserted into the hole 7 of the socket 2 thus improving the appearance of the fastener and the tag attached on it.

Fig. 18 shows a ninth embodiment of this invention, in which the second connector rod 22 of the inserton head 4 is bent to connect the head portion 17 to the end surface of the socket 2 through the first tie piece 24. This construction provides the same effect as the eighth embodiment.

Fig. 19 shows a tenth embodiment of this invention illustrating a fastener assembly formed of a number of fasteners 1, in which the sockets 2 are connected to each other by first subconnector bars 29 and the intermediate expanded portions 16 of the filaments 3 are connected to the main connector bar 36 (which serves as a runner when molding the fastener assembly) by second subconnector bars 30. This first and second subconnector bars can easily be broken off.

Fig. 20 shows an eleventh embodiment of this invention which is a variation from the tenth embodiment shown in Fig. 19. The eleventh embodiment has the sockets 2 connected to the second main connector bar 37 through third subconnector bars 31.

Fig. 21 shows a twelfth embodiment of this invention, in which the sockets 2 are connected to each other through fine connector pieces and also connected to a second main connector bar 37 through third subconnector bars 31.

Fig. 22 shows a thirteenth embodiment in which the fasteners 1 as illustrated in Fig. 1 are arranged in staggered relationship. Th staggered arrangement of th fasteners 1 reduces the intervals between the fasteners 1 thus increasing the number of fasteners 1 that can be formed in a single molding operation. This arrangement also simplifies the machining work of the mold. Designated at 38 is a third main connector bar to which the insertion heads 4 are connected through fourth subconn ctor bars 32 or sixth subconnector bars 34. The sockets 2 are also connected to the third main connector bar 38 through fifth subconnector bars 33 or seventh subconnector bars 35. These subconnector bars can easily be broken off by hand. These subconnector bars 29, 30, 31, 32, 33, 34, 35 have their junction points with the fasteners throttled so that no fragments of the subconductor bars are left on the fasteners when they are separated from them.

Next, the process of engaging the insertion head 4 with the socket 2 of the fastener 1 of Figs. 4 and 5 will be explained referring to Fig. 3.

First the first connector piece 24 is broken off to separate the insertion head 4 from the socket 2. The insertion head 4 is passed through a tag *P* either before or after passng through a hole (not shown) of an article such as clothes. Then the insertion head 4 is inserted into the hole 7 of the socket. As the insertion head 4 is guided along the insertion hole 7 and the head portion 17 advances through the guide surface 12 of the engagement tooth 8, the engagement pieces 18 are pressed by the guide surface toward the first connector rod 19 so that the outer surface of the engagement pieces 18 is flush with the outer circumferential suface of the head portion 17. This enables the insertion head 4 to smoothly clear the guide surface of the engagement tooth 8.

As soon as the rear free end of the engagement pieces 18 clears the annular projection 9 of the engagement tooth 8, the engagement pieces 18 snap open by the resiliency and their rear free ends are trapped and supported between the annular wall 6, the engagement surface 11a and the slide surface 13. At the same time the stopper 21 abuts against the other end of the annular projection 9 blocking the further advancement of the insertion head 4.

At this point, the insertion head 4 is held immovable in either direction, that is, it cannot either be retracted or advanced through the insertion hole 7.

Since the preceding thirteen embodiments (Figs. 4 through 22) the filament 3 is folded at the middle and a weak connection such that it can easily be broken off by hand is made between the socket 2 and the insertion head 4 or between the insertion head and the filament 3, th filament of the fastener which is molded but not yet subjected to the drawing process is at least two times longer than that of the conventional fastener formed from the mold of the same length.

Therefore when fasteners of the same length as th conv ntional fasteners are to b form d, the length of the mold can b halved reducing th size of the molding d vice. At

the same time the molding pressur can also be reduced, which in turn reduces the power consumption and prevents formation of flash that may result from the use of high molding pressure. In this way the present invention improves the quality of products.

In addition, the stroke of the drawing machine for extending the filament portions of fasteners of this invention is half that required for the conventional fasteners and this improves the productivity considerably and enables the use of simpler drawing machines of lower rating.

Furthermore, since a weak connection that can easily be broken off by hand is formed between the external end of the socket having an insertion hole and the insertion head or between the filament portions near the insertion head and socket to form an endless loop, the socket and the insertion head are kept from separating from each other thus facilitating the coupling work done manually or with a coupling device. Therefore the efficiency of the tagging work is greatly improved.

Moreover, the endless form of the fasteners of the first through thirteenth embodiments facilitates the handling when packing them in cartons or when tagging.

Next a fourteenth embodiment of this invention will be described referring to Figs. 23 and 24.

In the preceding embodiments the tag *P* attached on the filament 3 is free to move along the filament 3. Because of this the tag *P* sometimes may not come to the desired position on the filament or may turn with the back showing. To overcome this drawback the fourteenth embodiment makes it possible to securely fix the tag *P* to a certain location on the filament 3 of the fastener and also to fix the tag *P* to the fastener prior to the tagging work.

The construction of this embodiment is as follows. As in the preceding embodiments the filament 3 is folded at the intermediate expanded portion 16 and a weak connection is made between the insertion head 4 and the socket 2 or between the insertion head 4 and the filament 3. What characterizes this embodiment is a tag mount 40 attached to the external end of the intermediate expanded portion 16. The tag mount 40 consists of a tie piece 41 projecting from the intermediate expanded portion 16, a seat plate 42 connected to the tie piece 41 and an engagement projection 43 protruding from the seat plate 42.

The tie piece 41 is so formed that it cannot be esily broken off. The engag ment projection 43 has a sufficient length so that aft r passing through the hole of the tag it still protrudes the other side of th tag. Th tag mount 40 is form d integral with th fastener 1 at the time of molding.

The process of tagging using th fastener 1 of the fourteenth embodiment will b explained in the following.

As shown in Fig. 25 and Fig. 26 which is a view taken from the arrow A of Fig. 25, the engagement projection 43 is passed through a hole cut in the tag *P* near the end and slightly larger in diameter than the projection 43, and the head of the projection 43 protruding from the other side of the tag *P* is fused by a heated iron to form a flange 45 so as to prevent the tag *P* from coming off the engagement projection 43. Then the socket 2 and the insertion head 4 are separated and the insertion head 4 is passed through a hole of an article such as clothes and is inserted into the socket 2. With the above simple procedure the tag *P* can easily be attached to articles and prevented from moving. The close arrangement of socket 4 and insertion head 4 makes the tagging work easy. The intermediate expanded portion 16 may not necessarily be provided and the tag mount 40 may be directly attached to the filament 3 at the folded portion.

Fig. 27 shows a fifteenth embodiment of this invention in which a large number of fasteners 1 of the fourteenth embodiment are molded at the same time to form a fastener assembly 1′. The insertion head 4 and the tag mount 40 at each end of the fastener 1 are connected to the connector bars or runners 48, 49 through tie pieces 46, 47 which are easily breakable. With this structure of the assembly 1′ it is possible to mold a large number of fasteners at one time.

Fig. 28 shows a sixteenth embodiment in which the location of connection between the socket 2 and the insertion head 4 of the fastener 1 is changed from that of the fourteenth embodiment. Many variations on the location of connection between the insertion head 4 and the socket 2 are possible as shown in the first through ninth embodiments.

Figs. 29A and 29B show a seventeenth embodiment of this invention, in which a resilient engagement projection 50 is formed on the seat plate 42. The tag once fitted over the body portion 50a of the engagement projection 50 will be prevented from coming off by a stopper 50b.

Figs 30A and 30B show an eighteenth embodiment of this invention, in which the tag mount 40 consists of a female engagement member 51 located outside the intermediate expanded portion 16 and a male engagement member 52 l cated inside the intermediat expanded portion 16, the female and male engagement members being connected to th portion 16 through tie pieces 51a, 52a. When a tag is to be attached, the male engagement member 52 is bent as shown by the arrow A to fit the projection 52b f th male engagement member 52 into a recess 51b of the female engag ment member 51 as

shown by the arrow B, thus clamping the tag between them.

In the fourteenth to eighteenth embodiments tag mount is provided to th filament 3 at the folded portion for secure attachement of the tag. The provision of the tag mount prevents the tag from moving along the filament and makes it possible to secure the tag to the desired position on the article. The tag mount also renders easy the tagging work.

The fasteners of these embodiments have another advantage that since tags can be attached to the fasteners before shipment the time consuming tag attaching work on the part of the user or store personnel can be obviated.

Furthermore, since the filament is folded at the middle and and the filament portions 14 and 15 are arranged almost parallel to each other, the similar effect as obtained with the first to thirteenth embodiments can also be attained.

Figs. 31A and 31B and Figs. 32A and 32B show a nineteenth embodiment of this invention.

In the fourteenth to eighteenth embodiments the tag can be secured to the filament of the fastener but the individual tag attaching should be done manually, which will take a lot of time. To overcome this drawback the nineteenth embodiment is so constructed as to enable a large number of fasteners to be attached with tags at one time.

Each fastener 1, as shown in Figs. 31A and 31B, consists of a socket 2, an insertion head 4 and a filament 3, the filament being folded at the middle portion. At the folded portion is provided an intermediate expanded portion 16 at the outside of which is provided a tag mount 40, similar to that of the fourteenth embodiment (Figs. 23 and 24). A seat plate 42 of the tag mount 40, a tie piece 41 and one side of the intermediate expanded portion 16 are arranged on the same plane.

In the example arrangement shown in Fig. 32A, a number of fasteners are parallelly arranged with each fastener folded at the intermediate expanded portion 16 like a letter V. The socket 2 and the insertion head 4 of the adjacent fasteners 1 are connected by weak tie pieces 24 to form connecting portions 55 and these connecting portions 55 are spaced from each other at intervals *T* equal to the width of the tag *P* attached to the fasteners and are each connected to the runner 48 by tie pieces 46.

With th fasteners 1 connected to th runner 48 in this manner the invervals betw en th tag mounts 40 are also *T*, so that a series of tags *P* of the number of which is equal t that of the fast ners can easily b attach d to the tag mounts f the fasteners 1. After the tags *P* are fitted to th tag mounts 40, a heat d roller may be used to fuse th end of th ngagem nt projection 45 of the tag mount 40 protruding from the tag *P* to form a flange 45 which then h lds the tag from coming off th tag mount.

Fig. 33 illustrates a twenti th embodim nt and Fig. 34 a twenty-first embodiment. In Fig. 33 a socket 2 and an insertion head 4 are each connected directly to the runner 48.

In the 21st embodiment the runner 48 is provided with a projection 48a to each side of which are connected the socket 2 and the insertion head 4 in such a manner that they can easily be separated from the runner 48.

With this invention a large number of tags *P* can be fitted and secured to the fasteners at one time by an automatic device before the fasteners are delivered to stores. Thus, the store personnel is only required to separate individual tags *P* along the perforated line 56 of Fig. 32A and then separate the corresponding fasteners 1 from the runner 48 for attaching tags to merchandise. Thus the work required of the store personnel for attaching tags to merchandise is very simple.

As a twenty-second embodiment it is possible to construct the tag mount 40 as shown in Figs. 29A and 29B for the seventeenth embodiment.

As a twenty-third embodiment the tag mount 40 may be formed in Figs. 30A and 30B.

In the 19th through 23rd embodiments the fasteners of various sizes corresponding to the tag size can be obtained by setting the angle made between the V-shaped filament portions of the fastener in accordance with the size of the tag. When the melted synthetic resin is poured into the runner of the mold thus manufactured, a fastener assembly without discontinuity can be obtained. The number of fasteners connected to the runner can be determined when manufacturing the mold.

Fig. 35 shows a twenty-fourth embodiment of this invention in which unlike the 19th through 23rd embodiments (Figs. 31A and 31B through 34), the tag mount 40 of the fastener 1 is connected to the runner. A number of fasteners 1 are parallelly arranged at intervals *T* equal to the width of the tag and are connected to the runner 48.

As shown in Fig. 36, a strip of tags *P* perforated so that each tag of a width *T* can easily be separated by hand is attached to the engagement projections 43 of the tag mounts 40, after which ends of the engagement projections 43 are fused by a heated roller to form flanges 45 thereby securing the tags P to th fasteners 1.

As d scribed above, since the tag mounts 40 are accurat ly spac d at intervals *T* equal to the width of each tag *P* and are disposed corresponding to the l cati n of each mounting hole cut in the individual tag *P*, the attachm nt of tag strip *P* to the fastener ass mbly can be done r adily using an automatic attaching device.

As a variation of the 24th embodiment the tag mounts 40 may b formed as shown in Figs. 29A and 29B or Figs. 30A and 30B.

The 24th embodiment (Figs. 35 through 37) ensures a ready and quick tagging operation with the use of an automatic device since a number of fasteners are connected to the runner with tag mounts spaced at intervals equal to the width of each tag.

Since the fasteners of these embodiments can be attached with tags by the maker before shipment, the amount of tagging work on the part of user such as stores can be reduced.

That is, the only work required of the user is to remove the runner 48 from the fasteners by breaking the tie pieces 40 and separate each tag *P* along the perforated line 56 of Fig. 36 for quick attachment of tags onto merchandise.

The fastener assembly of the present invention can be formed by pouring melted synthetic resin through the runner of the mold.

The 20th through 24th embodiments can achieve the same effects as those of the preceding 1st through 13th embodiments since the fasteners of these embodiments have their filament folded at the middle.

Figs. 38A and 38B show a twenty-fifth embodiment of this invention, in which the filament 3 is folded at the middle and the filament portion 14 extending from the socket 2 and the filament portion 15 extending from the insertion head 4 are interconnected by a weak connection that can easily be broken by hand. Since the two filament portions 14 and 15 are virtually held together with only a slight gap *D* between them, such troubles as filament, insertion head or socket getting trapped in this gap *D* or other fasteners getting entangled with the trapped fastener can be prevented.

The filament portion 14 extending from the socket 2 is provided with a bulge 61 and the filament portion 15 extending from the insertion head 4 with a bulge 62 and these two bulges 61 and 62 are connected by a weak connection piece. The filament portion near the socket 2 is bent so that the socket 2 is disposed away from the insertion head 4.

These two bulges 61 and 62 are, as shown in Fig. 36B, connected via a readily breakable weak tie piece 24 and the filament portions 14 and 15 are set almost parallel and held close together.

The gap *D* between the filament portions 14 and 15 are set so small, at around 0.3 to 0.5 mm, that no filament, insertion head or socket or other fasteners cannot get into this gap.

The global bulges 61 and 62 can hav any size and may not necessarily be provided. The filament portions 14 and 15 can directly be interconnected by the tie piece 24. The ends of the filament portions 14 and 15 are tied togeth r by an intermediate global bulg 63.

In summary the fastener of the 25th embodiment has its filam nt portions 14 and 15 arranged v ry close tog ther and shaped lik a letter r with the filament portion 14 near the socket 2 bent so that the socket 2 is disposed away from the axis of the filament portion 15 extending from the insertion head 4.

The tie piece 24 between the global bulges 61 and 62 is a member to hold the filament portions 14 and 15 together to form an endless loop until the insertion head 4 is fitted into the insertion hole 7 of the socket 2. When the insertion head 4 is to be fitted into the insertion hole 7 or the socket 2, the connection between the global bulges 61 and 62 can be easily broken as by twisting the insertion head 4 with the socket 2 held immovable.

Figs. 39A through 39C show a twenty-sixth embodiment of this invention, in which the filament portions 14 and 15 extending from the socket 2 and the insertion head 4 are directly connected by a tie piece 24. No global bulges are formed and the structure of the socket 2 and the insertion head 4 is similar to that of the 25th embodiment.

The tie piece 24 may be needle-shaped as shown in Fig. 39A or conical as in Fig. 39B, or nipple-shaped as in Fig. 39C.

Figs. 40A through 40D show a twenty-seventh embodiment of this invention. In Fig. 40A the filament portions 15 and 16 are each provided with a plurality of global bulges 61, 61a, 61b and 62, 62a, 62b, and the global bulges on the filament portion 14 are connected to the corresponding global bulges on the filament portion 15 by tie pieces 24 as shown in Fig. 38B.

The provision of a plurality of connections holds the two filament portions 14 and 15 more closely and tightly thereby making it further difficult for the small gap to be widened and almost impossible for other fasteners to get into the small gap.

Instead of using global bulges, the filament portions 14 and 15 may be directly interconnected by tie pieces 24 which can take any form like a needle shape as shown in Fig. 40B or a conical shape as shown in Fig. 40C or a nipple shape a shown in Fig. 40D.

Fig. 4 shows a twenty-eighth embodiment of this invention, in which the socket 2 is connected to the stopper 21 with the global bulges 61 and 62 on the filament portions interconnected by a readily breakable tie piece. This construction prevents the gap betwe n the filam nt portions 14 and 15 to b widened if during transportation the connection between th global bulges 61 and 62 should b broken, thereby preventing the entanglement of fasten rs.

Figs. 42A and 42B show a twenty-ninth embodiment of this invention, in which the socket 2 is formed into an oval tube as shown in Fig. 42A and the wall portion 64 at the

insertion hole 7 is formed thick as shown in Fig. 40B, a vertical cross section of the socket 2. The thick wall portion 64 is provided to facilitat the removing of th socket 2 out of the mold by pushing it by a push-pin.

Fig. 43 shows a thirtieth embodiment of this invention illustrating a number of fasteners molded at one time. The inserstion heads 4 and the sockets 2 are connected to a first main connector bar 36 through first and second subconnector bars 29 and 30 which are easily breakable by hand. Intermediate global bulges 63 on the filaments 3 are connected to a second main connector bar 37 through third subconnector bars 31 which are easily breakable by hand.

Fig. 44 shows a variation of the 30th embodiment of Fig. 30 (or a 31st embodiment), which consists of a large number of paired fasteners, the fasteners of each pair being arranged in opposite directions to reduce the intervals between the fasteners. This construction enables a large number of fasteners to be formed by a single molding and a reduction in the size of the mold.

According to the 25th to 31st embodiments the two filament portions 14 and 15 are arranged very close together and interconnected by weak connections, so that there is virtually no gap between the two filament portions thus preventing other fasteners from being trapped between the filament portions. Thus, when a large number of fasteners are packed in cartons and transported, they are completely free from entanglement and can easily be taken out of cartons one by one.

Therefore the use of fasteners of this invention for tagging assures high efficiency.

Further since the fasteners of the above embodiments are formed like a letter r and the filament portions 14 and 15 are arranged very close together and connected by readily breakable weak tie pieces, the filament portions can easily be separated from each other by picking up the socket and the insertion head by fingers after the socket or the insertion head is passed through the hole of tag. In this way the tagging work can be performed efficiently.

Furthermore, since the embodiments have their filament folded at the intermediate expanded portion, the same effects as those of the 1st through 13th embodiments can be attained.

CLAIMS

1. A fastener comprising a socket with an ins rtion hol , an insertion head to be inserted into the socket, and a filament having the socket at on end and the insertion head at the other, these constitutional members being int grally formed of thermoplastic synthetic resin, whereby the filament is folded at the middle and an easily breakable weak connection is formed between the external nd of the socket and the xternal end of the inserti n head or between the insertion head and a filament portion near the socket or betw en a filament portion near the insertion head and a filament portion near the socket.

2. A fastener as set forth in claim 1, where the filament portion extending from the socket and the filament portion extending from the insertion head are virtually parallel with each other.

3. A fastener as set forth in claim 1, where the filament portion extending from the socket and the filament portion extending from the insertion head are connected at their ends by an intermediate expanded portion.

4. A fastener assembly made up of a plurality of parallelly arranged fasteners, each fastener comprising a socket with an insertion hole, an insertion head to be inserted into the socket, and a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, whereby an easily breakable weak connection is formed between the external end of the socket and the external end of the insertion head or between the insertion head and a filament portion near the socket or between a filament portion near the insertion head and a filament portion near the socket, the folded portion of the filament is connected to a first connector bar by a readily breakable connection, and either the sockets are interconnected or the sockets and/or the insertion heads are connected to a second bar connector by readily breakable connections.

5. A fastener as set forth in claim 4, where all the fasteners are arranged in the same direction.

6. A fastener assembly as set forth in claim 4 or 5, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected at their ends by an intermediate expanded portion which is in turn connected to the first connector bar by a readily breakable weak connection.

7. A fastener comprising a socket with an insertion hole, an insertion head to be insertioned into the socket, a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, and a tag mount provided to the folded portion of the filament, whereby a readily breakable weak connection is formed between the external end of the socket and the external end of the insertion head or b tw n the insertion head and a filament portion near th sock t or betw n a filament portion near the insertion h ad and a filament portion near the socket and these constititutional members being integrally formed of thermoplastic synthetic resin.

8. A fastener as set forth in claim 7, wher the filament portion extending from the socket and the filament portion extending

from the insertion head are virtually parallel.

9. A fastener as set forth in claim 7 or 8, where an intermediate expanded portion is provided to the folded portion of the filament and the tag mount is provided to the intermediate expanded portion.

10. A fastener as set forth in any one of claims 7 through 9, where the tag mount is projected outside from the folded portion of the filament.

11. A fastener as set forth in any one of claims 7 through 9, where the tag mount consists of a female engagement portion projecting outside the folded portion of the filament and a male engagement portion projecting inside the folded portion.

12. A fastener assembly made up of a plurality of parallelly arranged fasteners, each fastener comprising a socket with an insertion hole, an insertion head to be inserted into the socket, a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, and a tag mount provided to the folded portion of the filament, the tag mount being connected to a first connector bar by a readily breakable weak connection whereby a readily breakable weak connection is formed between the external end of the socket and the external end of the insertion head or between the insertion head and a filament portion near the socket or between a filament portion near the insertion head and a filament portion near the socket and either the sockets are interconnected by readily breakable weak connections or the sockets and/or insertion heads are connected to a second connector bar by readily breakable weak connections.

13. A fastener assembly as set forth in claim 12, where an intermediate expanded portion is provided to the folded portion of the filament and the tag mount is provided to the intermediate expanded portion.

14. A fastener as set forth in claim 12 or 13, where the tag mount is projected outward from the folded portion of the filament.

15. A fastener as set forth in claim 12 or 13, where the tag mount consists of a female engagement portion projecting outside the folded portion of the filament and a male engagement portion projecting inside the folded portion.

16. A fastener comprising a socket with an insertion hole, an insertion head to be inserted into the socket, a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle like a letter V, and a tag mount provided to the folded portion of the filament, wherby the socket and/or the insertion head are connected to a connector bar by readily breakable weak connections in such a manner that the interval between the adjacent tag mounts is equal to the interval between the holes of tags and all these constitutional members are formed integrally of thermoplastic synthetic resin.

17. A fastener as set forth in claim 16, where an intermediate expanded portion is provided to the folded portion of the filament and the tag mount is provided to the intermediate expanded portion.

18. A fastener as set forth in claim 16 or 17, where the tag mount is projected outside the V-shaped folded portion of the filament.

19. A fastener as set forth in claim 16 or 17, where the tag mount consists of a female engagement portion projecting outside the V-shaped folded portion of the filament and a male engagement portion projecting inside the V-shaped folded portion.

20. A fastener comprising a socket with an insertion hole, an insertion head to be inserted into the socket, a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, a tag mount provided to the folded portion of the filament whereby the tag mounts are connected to a connector bar by readily breakable weak connections in such manner that the interval between the adjacent tag mounts is equal to the interval between the holes of tags and all these constitutional members are intergrally formed of thermoplastic synthetic resin.

21. A fastener as set forth in claim 20, where an intermediate expanded portion is provided to the folded portion of the filament and the tag mount is provided to the intermediate expanded portion.

22. A fastener as set forth in claim 20 or 21, where the tag mount is projected outside from the folded portion of the filament.

23. A fastener as set forth in claim 20 or 22, where the tag mount consists of a female engagement portion projecting outside the folded portion of the filament and a male engagement portion projecting inside the folded portion.

24. A fastener comprising a socket with an insertion hole, an insertion head to be fitted into the socket, and a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, whereby the filament portion extending from the socket and the filament portion extending from the insertion head are arranged closely together and interconnected by a readily breakable weak connection so that the insertion head is disposed near the socket with either the insertion head or th socket projecting beyond the other, and all these constitutional members are formed integrally of thermoplastic synthetic resin.

25. A fastener as set forth in claim 24, where the insertion head is projected beyond the socket.

26. A fastener as set forth in claim 24 or 25, where the filament portion extending from the insertion head and the filament portion

extending from the socket are directly interconnected by a readily breakable weak connection.

27. A fastener as set forth in claim 24 or 25, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected by a readily breakable connection through expanded or bulged portions formed on the filament portions.

28. A fastener as set forth in claim 25, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected by a readily breakable weak connection through expanded or bulged portions formed on these filament portions and the socket is connected near the insertion head by a readily breakable connection.

29. A fastener as set forth in claim 25, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected by a readily breakable weak connection through expanded or bulged portions formed on these filament portions, the socket is formed into an oval cylinder, and the insertion hole of the socket is provided with a thick wall.

30. A fastener as set forth in any one of claims 24 through 29, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected at their ends by an intermediate expanded portion.

31. A fastener assembly made up of a plurality of parallelly arranged fasteners, each fastener comprising a socket with an insertion hole, an insertion head to be inserted into the socket, and a filament having the socket at one end and the insertion head at the other, the filament being folded at the middle, whereby the filament portion extending from the socket and the filament portion extending from the insertion head are arranged closely together and interconnected by a readily breakable weak connection, the insertion head is disposed near the socket, the insertion head and the socket are each connected to a first connector bar by readily weak connection, the folded portion of the filament is connected to a second connector bar by a readily breakable weak connection, and all these members are integrally formed of thermoplastic synthetic resin.

32. A fastener assembly as set forth in claim 31, where all the fasteners are arranged in the same direction.

33. A fastener assembly as set forth in claim 31, where the fasteners are arranged in opposite directions alternately.

34. A fastener assembly as set forth in any one of claims 31 through 33, where the insertion head is projected beyond the socket.

35. A fastener assembly as set forth in any one of claims 31 through 34, where the filament portion extending from the insertion head and the filament portion extending from the socket are directly interconnected by a readily breakable weak connection.

36. A fastener assembly as set forth in any one of claims 31 through 34, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected by a readily breakable weak connection through expanded or bulged portions formed on the filament portions.

37. A fastener assembly as set forth in any one of claims 31 through 36, where the filament portion extending from the insertion head and the filament portion extending from the socket are interconnected at their ends by an intermediate expanded portion which is connected to the second connector bar.

38. A fastener substantially as hereinbefore described with reference to and as shown in any of Figs. 4–44 of the accompanying drawings.

Printed for Her Majesty's Stationery Office
by Burgess & Son (Abingdon) Ltd.—1983.
Published at The Patent Office, 25 Southampton Buildings,
London, WC2A 1AY, from which copies may be obtained.